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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,087	01/22/2004	Alexander G. MacInnis	17403US05	6408

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EXAMINER
HASSAN, AURANGZEB

ART UNIT	PAPER NUMBER
2182	

MAIL DATE	DELIVERY MODE
08/04/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/763,087	MACINNIS ET AL.	
	Examiner	Art Unit	
	AURANGZEB HASSAN	2182	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 May 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *4,5 and 7-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4,5 and 7-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 4, 5 and 7 – 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ben-Yoseph. et al. (US Patent Number 5,949,439, hereinafter "Ben") in view of Robinett et al. (US Patent Number 6,351,474, hereinafter "Robinett").

3. As per claim 4, Ben teaches a unified memory system comprising: a memory (buffer memory, figure 2) that is shared by a plurality of devices including at least a central processing unit (host processor 102, figure 1) and a graphics processing unit (multimedia processor 106, figure 1); and a memory request arbiter coupled to the memory (resource manager 308, figure 3), wherein the memory request arbiter performs real time scheduling of memory requests from different devices having different priorities (column 7, lines 10 – 21), the unified memory system provides for real time scheduling of tasks (308 dictates control of 310 allowing for real time scheduling column 7, lines 17 – 20), and provides access to memory by requesters that are sensitive to latency and do not have determinable periodic behavior (column 8, lines 22 – 36).

Ben does not explicitly disclose a predetermined delay between subsequent accesses.

Robinett teaches a unified memory system wherein a predetermined minimum interval between subsequent accesses by a device is enforced, and wherein said predetermined minimum interval is long enough for another device to access (predetermined delay is enforced to allow for sufficient adjustment between subsequent scheduled accesses, column 7, lines 50 – 67).

It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify Ben with the above teachings of Robinett. One of ordinary skill would be motivated to make such modification in order to adjust scheduling of a multi-request handling system, column 7, line 63 to column 8, line 7).

4. Ben modified by the teachings of Robinett as seen in claim 4 above, as per claim 5, Ben teaches a unified memory system wherein the central processing unit and the graphics processing unit are sensitive to latency and do not have determinable periodic behavior (processing does not have periodic behavior, and aims to reduce latency in processing thereby disclosing latency, column 4, lines 47 – 49).

5. Ben modified by the teachings of Robinett as seen in claim 4 above, as per claim 7, Robinett teaches a unified memory system further comprising a circuit component associated with one or more devices and coupled between the associated devices and the memory request arbiter, wherein the circuit component is used to enforce at least a

predetermined minimum interval between subsequent accesses by the associated device to the memory (processor circuit introduces predetermined delay between subsequent accesses, column 7, line 50 to column 8, line 7, Ben: teaches access to the memory).

6. Ben modified by the teachings of Robinett as seen in claim 4 above, as per claim 8, Robinett teaches a unified memory system wherein the devices associated with the circuit component include a CPU (Robinette: processor 21, figure 1; Ben: process controller 202, figure 2).

7. Ben modified by the teachings of Robinett as seen in claim 4 above, as per claim 9, Robinett teaches a unified memory system wherein the devices associated with the circuit component make high priority service requests to access the memory through the circuit component (column 40, line 58 – column 41, line 34, circuit processor utilized to make high priority service requests. Ben: teaches access to the memory).

8. Ben modified by the teachings of Robinett as seen in claim 4 above, as per claim 10, Robinett teaches a unified memory system further comprising a round robin server for handling low priority tasks (column 28, lines 20 – 23).

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ben in view Robinett further in view of Ottinger (US Patent Number 6,070,231).

10. As per claim 11, Ben teaches a unified memory system comprising dual memory controllers, the dual memory controllers including a first memory controller (154, figure 1) and a second memory controller (156, figure 1) coupled to a memory arbiter performing real time scheduling (308, figure 3).

Ben/Robinett does not explicitly disclose a first and second memory controller coupled to a first and second arbiter.

Ottinger teaches a memory system comprising dual memory controllers (figure 1), the dual memory controllers including a first memory controller (24a, figure 1) and a second memory controller (24b, figure 1), the memory request arbiter including a first arbiter (59A, figure 2) coupled to the first memory controller and a second arbiter (59B, figure 2) coupled to the second memory controller, wherein the first arbiter and the second arbiter perform real time scheduling of memory requests (column 18, lines 34 – 38).

It would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to utilize the dual memory controller/interface of Ottinger in the above mentioned teachings of Ben/Robinett. One of ordinary skill would be motivated to make such modification in order to increase the performance of the system by reducing the average latency of memory requests (column 2, lines 10 – 25).

Response to Arguments

11. Applicant's arguments filed 5/7/2009 have been fully considered but they are not persuasive. Applicant argues that Robinett does not teach incurring delays by a device and access is to the memory.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The Examiner has clearly established that Ben is relied upon for access to the memory and the device which is requesting the access. Robinett is relied upon for contention issues of timing with respect to minimum delays being utilized in an access granting subsystem. Furthermore, Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Conclusion

12. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AURANGZEB HASSAN whose telephone number is (571)272-8625. The examiner can normally be reached on Monday - Friday 9 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tariq Hafiz can be reached on (571)272-6729. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AH

/Tariq Hafiz/
Supervisory Patent Examiner, Art Unit 2182